



HONOLULU AUTHORITY for RAPID TRANSPORTATION

PASSENGER VEHICLE FIRE RESISTIVITY TEST ISSUES

Issues

- **Vehicle floor and roof fire resistivity was not successfully demonstrated during recent laboratory testing conducted on February 25 & 27, 2019 in San Antonio, TX**
- **Fire resistivity design verification testing of the vehicle floor and roof was not conducted earlier because of Hitachi's confidence based on its earlier smaller-scale engineering testing and its prior history with this design**

Background

- **Vehicle Floor and Roof Fire Performance Requirement**
- **Compliance Demonstration Test**
- **Test Pass/Fail Criteria**

Non-Compliant Initial Test Results

- **Floor**

- Passage of flames into the passenger compartment observed at 14:30 (less than 20 minutes) - Fail
- Loss of structural integrity at 19:38 (less than 20 minutes) - Fail
- Temperature and structural integrity



Non-Compliant Initial Test Results

- **Floor Test-Furnace Temperature**

Hitachi

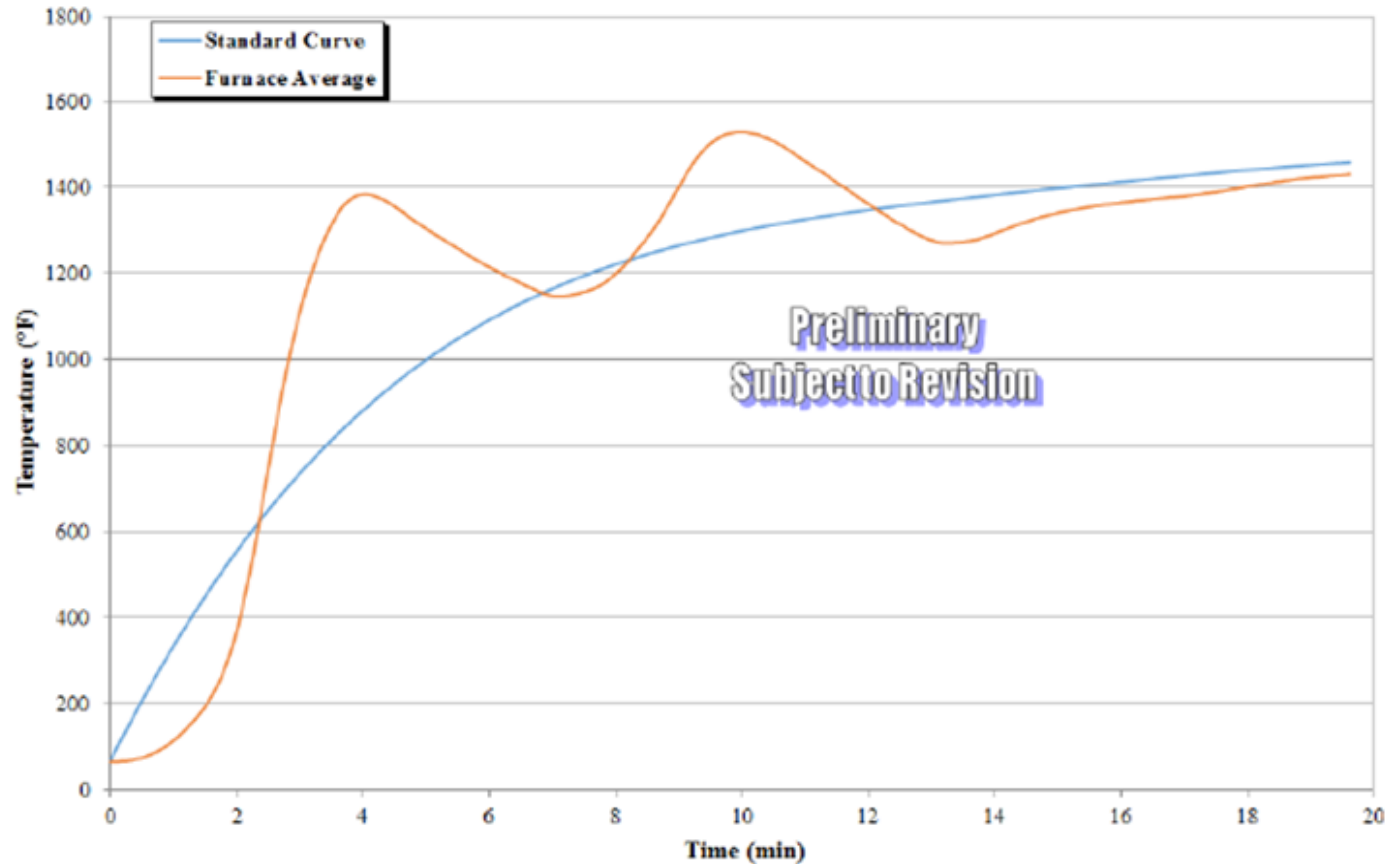
SwRI Project No. 01.21601.01.603

Test Date: February 25, 2019

Test ID: 19-056Hit603-1

Header

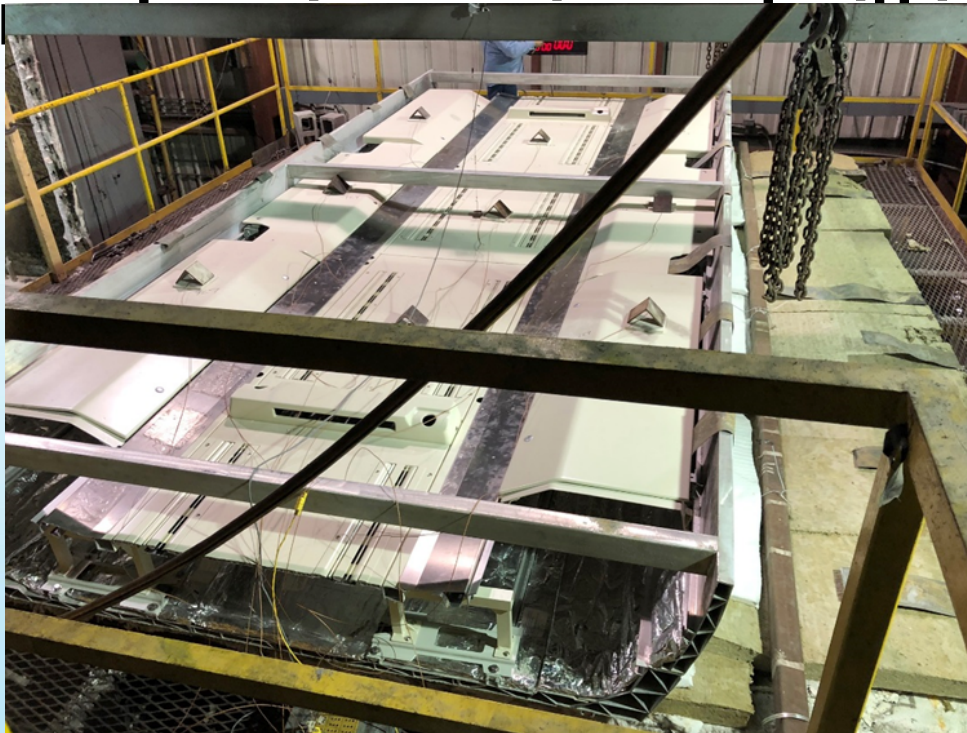
Furnace Curve



Non-Compliant Initial Test Results

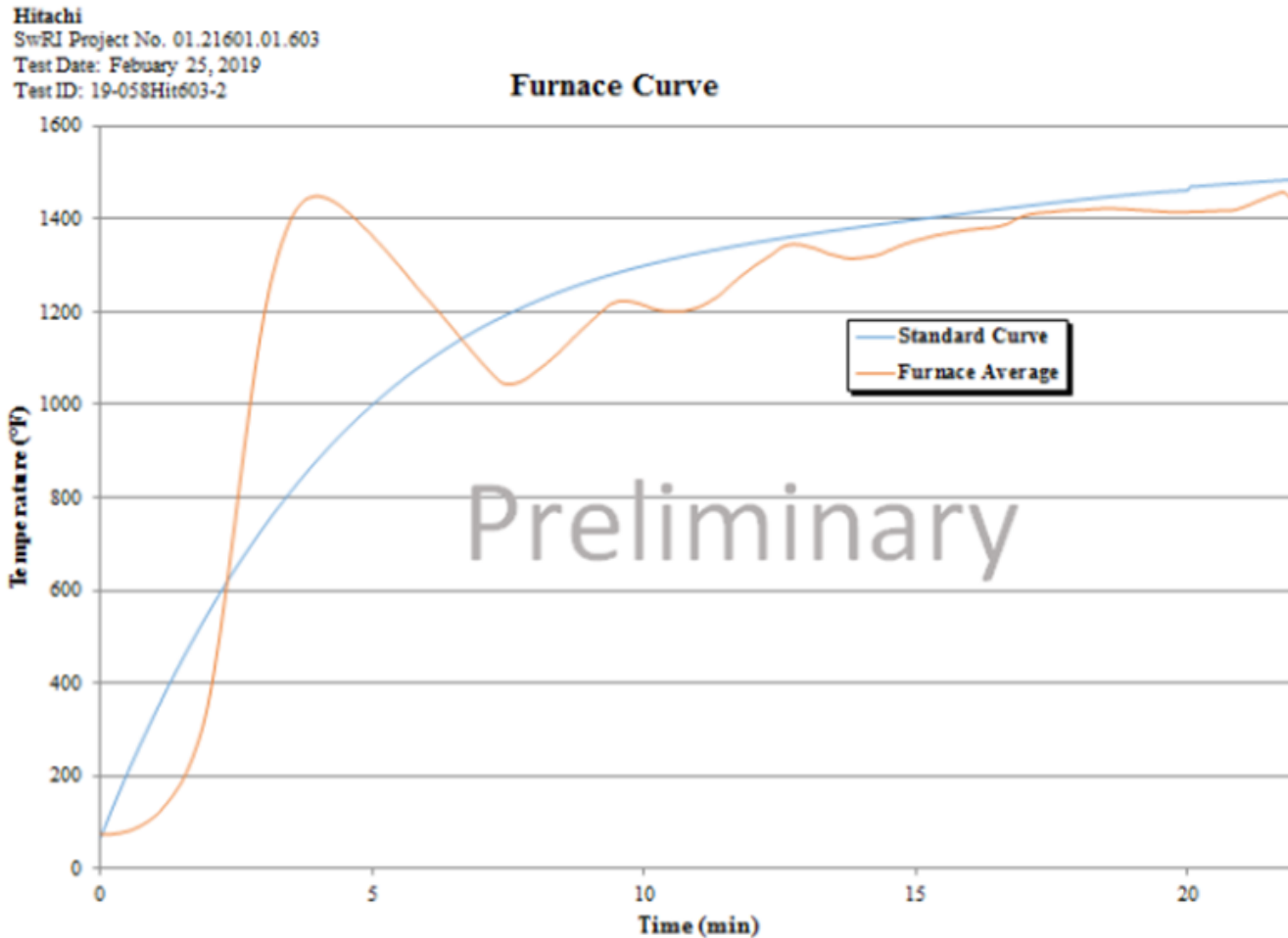
- **Roof**

- **Passage of flames into the passenger compartment observed at 16:30 (less than 20 minutes) - Fail**
- **No loss of structural integrity - Pass**
- **Temperature limits - Pass**



Non-Compliant Initial Test Results

- **Roof Test - Furnace Temperature**



Root Cause/Action Plan

- **AHJV has identified suspected root-cause for full-scale test failure as the significant departure of the furnace temperature from the specified temperature profile**
 - Test furnace reached 1,385°F after only 4 minutes during floor test (compared to specified ~850°F)
 - Test furnace reached 1,449°F after only 4 minutes during roof test (compared to specified ~850°F)
 - ❖ Specified temperature profile at 20 minutes is 1,450°F maximum
- **Hitachi to conduct re-test**
 - Hitachi proposed LAPI in Italy to expedite execution
 - Lab credentials under review to ensure compliance with ASTM E-119 test standards
 - Hitachi is currently preparing test specimens from completed production carshell in an effort to expedite re-test
 - Additional small-scale engineering tests to be conducted in mid-April to confirm suspected root cause prior to conducting full-scale re-test
 - Full-scale re-test targeted for first two weeks in May at LAPI in Italy

Root Cause/Action Plan

- **Second set of test specimens also being prepared in the event of issues discovered that require design modification and associated testing**
- **Hitachi to develop plan to ensure vehicle fire resistivity requirements are demonstrated in time to supply the required fleet for Interim Opening**

Mahalo!



HONOLULU RAIL TRANSIT